

Foreign R&D in the United States

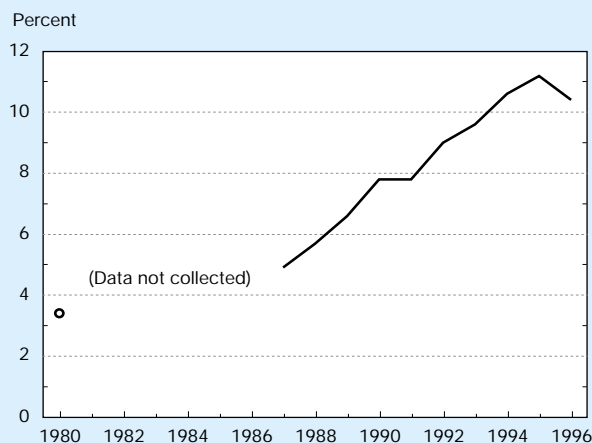
Like U.S. firms' overseas R&D funding trends, R&D activity by foreign-owned companies in the United States has increased significantly since the mid-1980s. From 1987 to 1996, inflation-adjusted R&D growth from foreign firms (U.S. affiliates with a foreign parent that owns 50 percent or more of the voting equity) averaged 10.9 percent per year. (See appendix table 2-71).⁶⁴ This growth contrasts favorably with the 3.9 percent average annual rate of real increase in U.S. firms' domestic R&D funding. It also is almost six times the 1.3 percent 1987–96 growth rate of total domestic industrial R&D performance (including activities funded by foreign firms and the Federal Government). As a result of these funding trends, foreign R&D was equivalent to 10.4 percent (\$15 billion) of total industrial R&D performance in the United States in 1996. This share is more than double that of its equivalent 4.9 percent share in 1987 but slightly lower than the calculated 1995 estimate (11.2 percent). Majority-owned affiliates accounted for a 3.4 percent share of the U.S. 1980 industrial performance total. (See figure 2-41.)

Country Sources of Industrial R&D

Most R&D financed by foreign affiliates in the United States comes from firms whose parents are located in just three countries: Germany, Switzerland, and the United Kingdom. Indeed, 81 percent of foreign R&D funding in 1996 came from just six countries—those three countries, plus France, Japan, and Canada. (See figure 2-42.) With the exception of Switzerland, these six countries are the same as those that receive the largest shares of U.S. overseas R&D investments. (Italy replaces Switzerland in that listing). Thus, the globalization of R&D is characterized by significant two-way flows of cross-border activities.

Looking beyond these major R&D country centers, however, the geographic pattern of R&D flows into the United States differs from the trends for U.S. R&D spending abroad. Whereas countries other than G-7 countries (and Switzerland) have become increasingly important as destinations for U.S. funding, they are becoming relatively less important in terms of foreign R&D investments here. For example, in 1980, firms from the six countries listed above accounted for a 69 percent share of the foreign R&D flows into the United States—a considerably smaller share than they currently account for. By contrast, those six countries accounted for 76 percent of

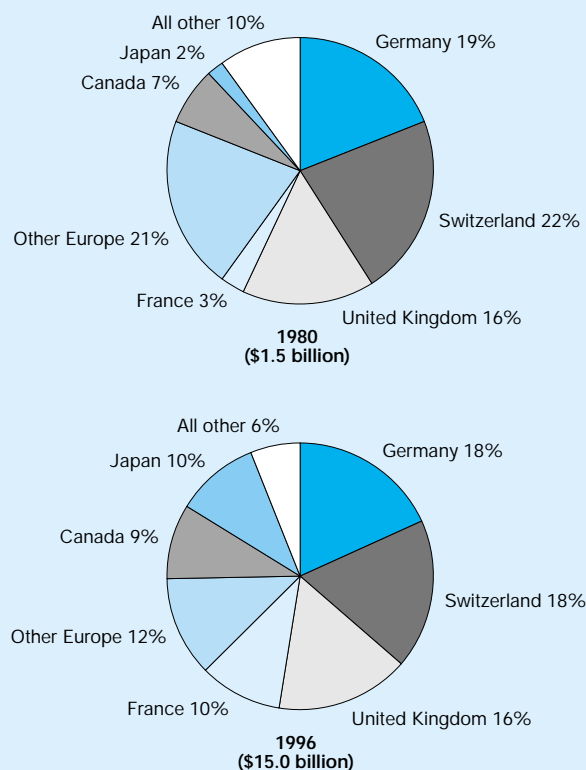
Figure 2-41.
U.S. industrial R&D financed by majority-owned foreign firms



NOTE: Data are available for 1980, and for 1987 and later years. See appendix tables 2-3 and 2-71.

Science & Engineering Indicators – 2000

Figure 2-42.
U.S. industrial R&D financed by majority-owned foreign firms



See appendix table 2-71. Science & Engineering Indicators – 2000

⁶⁴Although BEA considers all of an investment (including R&D) to be foreign if 10 percent or more of the investing U.S.-incorporated firm is foreign-owned, special tabulations were prepared by BEA to reveal R&D expenditures in the United States of firms in which there is majority foreign ownership (i.e., 50 percent or more). For 1996, the 10 percent foreign ownership threshold results in an estimated \$17.2 billion foreign R&D investment total. (See appendix table 2-70.) R&D expenditures of majority-owned U.S. affiliates of foreign companies were \$15.0 billion. (See appendix table 2-71.) Tabulations for the majority-owned firms' R&D financing are used for most of the analyses here; the sole exception is the use of foreign R&D data at the 10 percent threshold for review of country-specific funding patterns for individual industrial sectors. (See text table 2-21.) Such data for majority-owned affiliates are not available.

U.S. overseas R&D in 1982 but only 68 percent in 1996. At least part of the increase in R&D flows from Canada and other European countries over the past 15 years is attributable to several major acquisitions of U.S. firms by foreign multinational companies. Such acquisitions have been particularly instrumental in changing the foreign composition shares of U.S. pharmaceutical and biotechnology firms with large R&D budgets (Dalton, Serapio, and Yoshida 1999; Fahim-Nader and Zeile 1998).

Industry Focus of Foreign R&D

Foreign-funded research was concentrated in three industries in 1996: drugs and medicines (mostly from Swiss, German, and British firms), industrial chemicals (funded predominantly by German and Dutch firms), and electrical equipment (one-third of which came from French affiliates).⁶⁵ These three industries accounted for more than half of the \$17.2 billion total 1996 foreign R&D investment by affiliates in which there was at least 10 percent foreign ownership. Concurrent with gains reported for all domestic U.S. R&D performance, foreign—particularly Japanese and Swiss—R&D investment in the service sector was also significant.

⁶⁵Totals are for R&D expenditures for U.S. affiliates of firms in which there is 10 percent or more foreign ownership. (See previous footnote.)

Services accounted for 6 percent (\$966 million) of the 1996 foreign R&D investment total, with most research being funded by computer and data processing firms and companies providing research and management services. (See text table 2-21.)

U.S. Research Facilities of Foreign Firms

Consistent with the worldwide trend of multinational firms establishing an R&D presence in multiple countries, considerable growth has occurred in the number of R&D facilities operated by foreign companies in the United States. According to a 1992 survey of 255 foreign-owned freestanding R&D facilities in the United States, about half were established during the previous six years (Dalton and Serapio 1993); these data count only R&D facilities that are 50 percent or more owned by a foreign parent company.⁶⁶ An update to this study found that in 1998 there were 715 U.S. R&D facilities run by 375 foreign-owned companies from 24 different countries (Dalton and Serapio 1999). R&D facilities owned by Japanese firms continue to far outnumber those of any other coun-

⁶⁶An R&D facility typically operates under its own budget and is located in a free-standing structure outside of and separate from the parent's other U.S. facilities (e.g., sales and manufacturing). This definition of an R&D facility consequently excludes R&D departments or sections within U.S. affiliates of foreign-owned companies.

Text table 2-21.

R&D performed in the U.S. funded by affiliates of foreign companies, by selected country and industry of affiliate: 1996 (Millions of U.S. dollars)

Country	All industries	Manufacturing							Other non-	
		Total	Drugs & medicines	Other chemicals	Machinery	Electrical equipment	Transportation equip.	Instruments	Service industries ^a	manufacturing industries ^b
Total	17,150	13,807	5,849	1,517	935	2,954	454	720	966	2,377
Canada	1,397	1,228	1	20	D	D	11	11	21	148
Europe	12,516	11,007	5,754	1,413	532	1,581	360	520	607	902
France	1,712	1,641	474	144	97	487	42	90	32	39
Germany	3,084	2,767	1,343	478	[	592	]	196	56	265
Netherlands	948	743	1	375	1	D	D	1	8	197
Switzerland	3,375	2,985	2,575	55	[	188	]	–	64	24
United Kingdom	2,525	2,273	[	1,528	]	102	97	90	219	121
Asia and Pacific	2,592	1,159	[	149	]	[	558	]	80	45
Japan	2,070	1,001	72	55	204	242	77	37	337	732
Western Hemisphere	386	182	0	*	1	7	2	136	3	201
Middle East	121	106	D	D	73	D	0	8	10	5
Africa	81	70	0	5	D	D	0	0	*	11

D = withheld to avoid disclosing operations of individual companies * = less than \$500,000 [] = indicates where categories have been combined.

NOTES: Includes foreign direct investments only of nonbank U.S. affiliates in which the affiliate has a 10-percent-or-more ownership interest. Includes R&D expenditures conducted by and for the foreign affiliates. Excludes expenditures for R&D conducted by the affiliates for others under a contract.

^aIncludes computer and data processing services (\$642 million) and accounting, research and management services (\$306 million).

^bIncludes wholesale trade (\$1,735 million), retail trade (\$32 million), petroleum (\$436 million) and other industries (\$174 million).

SOURCE: U.S. Bureau of Economic Analysis, *Foreign Direct Investment in the United States: Operations of U.S. Affiliates of Foreign Companies Preliminary 1996 Estimates* (Washington, DC: July 1998)

tries: Japanese companies owned 251 R&D facilities in the United States, German companies owned 107, British companies owned 103, and French and Swiss companies each owned more than 40. (See text table 2-22.) South Korean companies have a rapidly growing presence in the United States, with 32 R&D facilities here in 1998—6 more than in 1994 and about 20 more than in 1992.

The activities of these foreign facilities were concentrated in a relatively small number of industries. In 1998 there were more than twice as many foreign-owned research sites for drugs and biotechnology (116 facilities) and chemicals and rubber (115 facilities) as for any other industry. Other industries for which there were more than 50 foreign-owned facilities in the United States included computers and computer software, high-definition television and other electronics, instruments and medical devices, and automotive products. Japanese companies account for most of the R&D centers in the electronics and automotive industries, whereas European companies have far more R&D sites focusing on pharmaceuticals and chemicals. A majority of the South Korean-owned facilities were devoted to research on computers and semiconductors.

Foreign R&D facilities were located in 39 states but were heavily concentrated in certain areas of the country. California ranks first with 188 foreign R&D facilities—notably around

Silicon Valley and greater Los Angeles—but other prime locations for such sites include Detroit; Boston; Princeton, New Jersey; and North Carolina's Research Triangle Park. According to Dalton, Serapio, and Yoshida (1999), Japanese companies initially established R&D laboratories in California but recently have been moving east. Conversely, European companies began on the East Coast and are moving west.

Foreign companies have invested in U.S.-based R&D facilities for a variety of reasons. For example, growth in foreign automotive R&D centers on assisting the parent company in meeting U.S. environmental regulations and customer needs (a home-base exploiting strategy). Japanese companies in particular have expanded the scope of their R&D activities in the U.S. in line with their expansion of auto production here. Major factors behind the growth in foreign-owned biotechnology R&D facilities (much of which has resulted from the acquisition of U.S. firms) include the favorable research environment in the U.S. (especially relative to the situation in countries that are less hospitable to genetics-based R&D) and the availability of trained scientists to do the research (a home-base augmenting strategy). Much of the foundation for the U.S. competitive advantage in health care and life science research was laid by decades of substantial public R&D investments.

Text table 2-22.

Foreign-owned R&D facilities in the United States, by selected industry and country: 1998

Industry	Japan	United Kingdom	Germany	France	Switzerland	South Korea	Netherlands	Canada	Others
Total	251	103	107	44	42	32	30	32	74
Computers	24	0	2	2	0	6	2	1	5
Software	35	8	3	0	0	1	2	3	1
Semiconductors	18	0	2	0	0	10	2	0	0
Telecommunications	16	3	4	2	1	1	0	3	4
Opto-electronics	10	3	2	0	0	0	0	0	5
HDTV, other electronics	33	9	5	3	5	5	1	1	3
Drugs, biotechnology	26	15	26	7	15	2	5	0	20
Chemicals, rubber	25	18	27	14	7	1	6	7	9
Metals	8	5	2	4	1	0	0	2	4
Automotive	31	0	8	2	0	4	2	5	2
Machinery	5	6	3	4	2	0	0	3	6
Instrumentation, medical devices	6	19	7	3	6	0	3	2	7
Food, consumer goods, misc	10	12	6	1	8	1	9	5	10

NOTES: The industry-specific detail may double-count some facilities because of the multiple focus of research performed. Not all industry categories are listed. The country totals are comprehensive and do not include double-counting.

SOURCE: U.S. Department of Commerce, *Globalizing Industrial Research and Development*, by D. H. Dalton and M. G. Serapio, and P.G. Yoshida. Washington, DC, 1999.